

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Original) A method for producing a fucosylated glycoprotein, the method comprising:

contacting a recombinant fucosyltransferase protein with a mixture comprising a donor substrate comprising a fucose residue, and an acceptor substrate on a glycoprotein, under conditions where the fucosyltransferase catalyzes the transfer of the fucose residue from a donor substrate to the acceptor substrate on the glycoprotein, thereby producing a fucosylated glycoprotein,

wherein the recombinant fucosyltransferase protein comprises a polypeptide having greater than 90% identity to an amino acid sequence selected from the group consisting of SEQ ID NO:2, 4, 6, and 8.

2. (Original) The method of claim 1, wherein the polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 2, 4, 6, and 8.

3. (Original) The method of claim 1, wherein the polypeptide comprises SEQ ID NO: 2.

4. (Original) The method of claim 1, wherein the polypeptide further comprises an amino acid tag.

5. (Original) The method of claim 1, wherein the method further comprises a step of purifying the fucosylated glycoprotein.

6. (Original) The method of claim 1, wherein the acceptor substrate is a glucose residue, and wherein the recombinant fucosyltransferase protein comprises a polypeptide having greater than 90% identity to SEQ ID NO:6.

7. (Original) The method of claim 1, wherein the acceptor substrate is an N-acetylglucosamine residue, and wherein the recombinant fucosyltransferase protein comprises a polypeptide having greater than 90% identity to an amino acid sequence selected from the group consisting of SEQ ID NO:2, 4, and 8.

8. (Original) The method of claim 1, wherein an acceptor substrate on the glycoprotein comprises Galb1-OR, Galb,3/4GlcNAc-OR, NeuAca2,3Galb1,3/4GlcNAc-Or, wherein R is an amino acid, a saccharide, an oligosaccharide, or an aglycon group having at least one carbon atom.

9. (New) An isolated polynucleotide comprising a nucleic acid sequence, wherein the nucleic acid sequence has greater than 90% identity to a nucleotide sequence selected from the group consisting of SEQ ID NO:1, 3, 5, and 7, wherein the nucleotide sequence encodes a fucosyltransferase that catalyzes the transfer of a fucose residue from a donor substrate to an acceptor substrate.

10. (New) The polynucleotide of claim 9, wherein the nucleic acid sequence is selected from the group consisting of SEQ ID NO:1, 3, 5 and 7.

11. (New) The polynucleotide of claim 9, wherein the fucosyltransferase catalyzes the transfer of fucose to an N-acetylglucosamine residue, and wherein the nucleic acid sequence has greater than 90% identity to a nucleotide sequence selected from the group consisting of SEQ ID NO:1, 3, and 7.

12. (New) The polynucleotide of claim 9, wherein the fucosyltransferase catalyzes the transfer of fucose to a glucose residue, and wherein the nucleotide acid sequence has greater than 90% identity to SEQ ID NO:5.

13. (New) An isolated polynucleotide comprising a nucleic acid sequence, wherein the nucleic acid sequence encodes a fucosyltransferase that catalyzes the transfer of a fucose residue from a donor substrate to an acceptor substrate, and wherein the fucosyltransferase comprises an amino acid selected from the group consisting of SEQ ID NO:2, 4, 6, and 8.

14. (New) The polynucleotide of claim 13, wherein the fucosyltransferase comprises an amino acid tag.

15. (New) An expression vector comprising the isolated polynucleotide of claim 9 or claim 13.

16. (New) A host cell comprising the expression vector of claim 15.

17. (New) A method of producing a fucosyltransferase protein, the method comprising the step of culturing the host cell of claim 16 under conditions suitable for expression of the fucosyltransferase protein.

18. (New) An isolated polynucleotide comprising a nucleic acid sequence, wherein the nucleic acid sequence consists of SEQ ID NO:11, wherein the nucleotide sequence encodes a biologically active fucosyltransferase that catalyzes the transfer of a fucose residue from a donor substrate to an acceptor substrate.

19. (New) The polynucleotide of claim 18, wherein the fucosyltransferase catalyzes the transfer of fucose to a glucose residue.

20. (New) An isolated polynucleotide comprising a nucleic acid sequence, wherein the nucleic acid sequence encodes a biologically active fucosyltransferase, and wherein the fucosyltransferase comprises an amino acid that consists of SEQ ID NO:12.

21. (New) An expression vector comprising the isolated polynucleotide of claim 18 or claim 20.

22. (New) A host cell comprising the expression vector of claim 21.
23. (New) A method of producing a fucosyltransferase protein, the method comprising the step of culturing the host cell of claim 22 under conditions suitable for expression of the fucosyltransferase protein.
24. (New) A recombinant fucosyltransferase protein comprising a polypeptide has greater than 90% identity to an amino acid sequence selected from the group consisting of SEQ ID NO:2, 4, 6, and 8, wherein the fucosyltransferase catalyzes the transfer of a fucose residue from a donor substrate to an acceptor substrate.
25. (New) The recombinant fucosyltransferase of claim 24, further comprising an amino acid tag.
26. (New) The recombinant fucosyltransferase of claim 24, wherein the polypeptide is selected from the group consisting of SEQ ID NO: 2, 4, 6, and 8.
27. (New) The recombinant fucosyltransferase of claim 24, wherein the fucosyltransferase catalyzes the transfer of fucose to an N-acetylglucosamine residue, and wherein the polypeptide has greater than 90% identity to an amino acid sequence selected from the group consisting of SEQ ID NO:2, 4, and 8.
28. (New) The recombinant fucosyltransferase of claim 24, wherein the fucosyltransferase catalyzes the transfer of fucose to a glucose residue, and wherein the polypeptide has greater than 90% identity SEQ ID NO:6.
29. (New) A recombinant fucosyltransferase protein comprising a polypeptide consists of SEQ ID NO:12, wherein the fucosyltransferase catalyzes the transfer of a fucose residue from a donor substrate to an acceptor substrate.
30. (New) The recombinant fucosyltransferase of claim 29, wherein the fucosyltransferase catalyzes the transfer of fucose to glucose.

31. (New) A method of making a fucosylated oligosaccharide, the method comprising:
- contacting the recombinant fucosyltransferase of claim 16 with a mixture comprising a donor substrate comprising a fucose residue, and an acceptor substrate comprising a sugar or oligosaccharide, under conditions where the fusion protein catalyzes the transfer of a fucose residue from the donor substrate to the acceptor substrate, thereby producing a fucosylated oligosaccharide.
32. (New) The method of claim 31, wherein the method further comprises a step of purifying the fucosylated oligosaccharide.
33. (New) The method of claim 31, wherein a donor substrate is GDP-fucose.
34. (New) The method of claim 31, wherein the fucosyltransferase comprises an amino acid tag.
35. (New) The method of claim 31, wherein an acceptor substrate comprises a member selected from N-acetylglucosamine and glucose.
36. (New) The method of claim 31, wherein the acceptor substrate is Lacto-N-neo-Tetraose (LNnT).
37. (New) The method of claim 36, wherein the fucosylated oligosaccharide is Lacto-N-Fucopentaose III (LNFP III).
38. (New) The method of claim 31, wherein the mixture further comprises lactose, a β -1,3-N-acetylglucosaminyltransferase, and a β -1,4-galactosyltransferase.
39. (New) The method of claim 38, wherein the β -1,3-N-acetylglucosaminyltransferase is a bacterial enzyme.
40. (New) The method of claim 39, wherein the β -1,3-N-acetylglucosaminyltransferase is from *Neisseria gonococcus*.

41. (New) The method of claim 38, wherein the β -1,4-galactosyltransferase is a bacterial enzyme.

42. (New) The method of claim 41, wherein the β -1,4-galactosyltransferase is from *Neisseria gonococcus*.

43. (New) The method of claim 38, wherein the fucosylated oligosaccharide is Lacto-N-Fucopentaose III (LNFP III).

44. (New) A method for producing a fucosylated glycolipid, the method comprising:

contacting the recombinant fucosyltransferase protein of claim 24 with a mixture comprising a donor substrate comprising a fucose residue, and an acceptor substrate on a glycolipid, under conditions where the fucosyltransferase catalyzes the transfer of the fucose residue from a donor substrate to the acceptor substrate on the glycolipid, thereby producing a fucosylated glycolipid.